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Annex 1

50X1-HUM

Radar Devices Manufactured by VEB Funkwerk at Koepenick

Type: FGS 370

Work Name: KSA 1b

Range of use: Navigation radar for fishing and merchant vessels as well as for NVA-units. The devices are also used for coast control.

Technical Data:

Transmitter	Frequency:	9375 ± 30 Mc (3.2 cm)
	Pulse performance:	15 kW
	PRF:	1 Kc
	Pulse duration:	0.5 µsec.
Indication:	Measuring range:	3-12-30 naut.mi.
	Smallest measurable distance:	150 m
	Discrimination distance:	150 m
	Discrimination angle:	2°
Antenna	Number of revolutions:	20 r.p.m.
	Half power point, hor.:	2°, vert. 20°
	Shape:	Cheese-box type, opening 120x10 cm on a 2.4 m high base

Weight of the entire unit: 560 kg

Development: The first mode, developed between 1951 and 1954 under the designation KSA 1a, did not go into production. In 1955/1956 the improved design KSA 1b was developed.

Production: 1957 approximately 40 devices

Production was suspended in late 1958.

Customers: The following devices were delivered in 1957:

15 devices to China for use aboard ships and along the coast,
10 devices for KRAKE-Class units,
5 devices for coastal stations, including 2 for Arkona (Ruegen) and one each for Warnemuende, Poel Island and Wustrow Naval School. (Another radar unit was presumably supplied to Boltenhagen)
5 trawlers,
as well as individual installations for various ships.

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Annex

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Radar Devices Manufactured by VEB Funkwerk at Koepenick

Type: (NVA-designation: Wellensittich I(Parakeet I))
Work Name KSA 2

Range of use: Prototype of further development, particularly of devices KSA 3 and KSA 4.

Technical Data:

Transmitter	Frequency:	9,375 Mc
	Pulse Performance:	40 kW
	PRF:	2 Kc
	Pulse Duration:	0.2 µsec.
	Magnetron:	A 720
Indication:	Measuring ranges:	0.75-1.5-3-6-12 naut. mi.
	Smallest measurable distance:	
	Discrimination distance:	
	Discrimination angle:	
	with remote indicator	
Antenna	Number of revolutions	
	Beaming hor.: 1.5°, vert.: 20°	
	Shape: Oval parabolic reflector, 1.5 m wide, (Round reflector, the margin of which is enlarged by aluminum stripes.)	

Development: 1956/57

Production: No series production

Customer: In 1953 the model was tested at sea by the NVA.

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Annex 3 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk at Koepenick

Type: FGS 392

Work Name: KSA 3 and KSA 3S

Range of use: Navigation radar for fishing and merchant vessels as well as for NVA-units.

Technical Data:

Transmitter
- Frequency: 9,375 Mc
- Pulse performance: approx. 40 kW
- PRF: 2 Kc
- Pulse duration: 0.2 µsec.
- Magnetron: 730

Indication:
- Measuring ranges: 0.75-1.5-3-6-12-24 naut. mi.
- Smallest measurable distance: 60 m
- Discrimination distance: 40 m
- Discrimination angle: 2°

with distance measuring equipment, connection for one remote indicator and north orientation of the radar display by connection with a gyro-compass.

Antanne
- Number of revolutions: 20 r.p.m.
- Beaming, hor.: 2°, vert.: 20°
- Shape: parabolic reflector 134 x 40 cm
- Weight of the installation (without remote indicator): 270 kg.

Development: The device was first tested aboard MV METEOR in the spring of 1958, in the autumn of 1958 it was tested at sea aboard KRAKE units.

Production:
- 1959: 3 models
- 1960: 80 devices
- 1961: 50 devices
- 1962: 50 devices, production was ended. As the device was lacking quality it has not received a certificate of quality since 1961.

Customers: In April 1961 the following devices had been delivered:
- 32 to the NVA
- 12 **for fishing and merchant vessels**
- 3 to Poland
- 1 (?) to Communist China.

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Annex 4 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk Koepenick

Type: (NVA-Designation: Möwe - (Seagull))

Work Name: KSA 4

Range of use: This type is fitted out with a bigger antenna and is used in harbors and along the shore.

Technical Data:

Transmitter:	Frequency:	9,375 Mc
	Pulse performance:	40 kW
	PRF:	500 Kc
	Pulse duration:	0.2 and 1 μsec
	Magnetron:	730
Indication:	Measuring ranges:	0.75 ---- 48 naut. mi.
	Maximum range:	70 naut. mi.
	Smallest measurable distance:	
Antenna	Number of revolutions:	20 r.p.m.
	Beaming, hor.:	$< 1^{\circ}$
	Shape:	parabolic reflector 3.5 m wide, 0.6 m high, made of aluminum stripes.
		Faraday Rotator for rotations of the plane of polarization.

Production: No series production

Customer: NVA

In early 1958 two devices installed in trucks were taken to Stralsund for testing at Daenholm. In the first half of 1959 the devices were returned to the firm for overhaul.

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Annex 5 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk Koepenick

Type: FGS 350

Work Name: KSA 5 (also: Kolibri (hummingbird)/ Wellensittich II (parakeet II))

Range of use: Navigation radar for small vessels

Technical Data:

Transmitter	Frequency:	9,375 Mc
	Pulse performance:	approx. 10 kW
	PRF:	1,600 Kc
	Pulse duration:	up to 1.5 naut.mi.: 0.1 μsec
		up to 3 naut.mi.: 0.5 μsec
	Magnetron:	2J42
Indication	Measuring ranges: 0.75-1.5-3-6-12 naut. mi. (Each measuring range can be doubled)	
	Maximum range: 24 naut. mi.	
	Smallest measurable distance: approx. 25 m	
	Discrimination: distance:	
	angle: approx. 2°	
Antenna	Number of revolutions: 20 r.p.m.	
	Beaming, hor.: 2°, vert.: 20°	
	Shape: like KSA 3	
	Weight without converter: 90 kg	

Development:	1958: development of the laboratory model
Mid	1959: testing at Stralsund
Early	1960: first trial
Production:	1960: display at the Leipzig spring fair
	1961: 65 devices
until mid	1962: 80 devices
Customer:	In 1962 sixty installations were delivered to Cuba.

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Annex 6 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk Koepenick

Type: FGS 360

Work name: KSA 6 and KSA 6 E

Range of use: Successors to models KSA 3 and KSA 3 S.
Types KSA 5 and KSA 6 are to be built as standard devices.

Technical Data:

Transmitter
Frequency: 9,375 Mc
Pulse performance: 40 kW
PRF: 800-1,600 Kc
Pulse duration: 0.8-0.2 μsec.

Indication
Measuring ranges: 0.75-1.5-3-6-12-24-48 naut.mi.
Maximum range: 48 naut. mi.
Discrimination distance:
Discrimination angle:
Installation for True Motion-representation.

Antenna
Number of revolutions: 20 r.p.m.
Beaming, hor.: 1.3°, vert.: 20°
Shape: like KSA 3
Sector scanning. The KSA E unit allows the rotation of the polarization plane. The device can be equipped with a 3.5 cm wide antenna.

Development: Development works started in 1958
1961: Testing of the model. Several practical alterations were made in late 1961.

Production program: 1963: 100 devices
1964: 100 devices
1965: 80 devices

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Annex 7 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk Koepenick

Type: -

Work name: KSA 7

Range of use: Navigation radar for inland navigation

Technical Data:

Transmitter	Frequency:	9,375 Mc
	Pulse performance:	7 kW
	PRF:	1,600 pc
	Pulse duration:	0.05 µsec
Antenna	Number of revolutions:	
	Beaming, hor.: 1°, vert.: 20°	
	Shape: two-storey Cheese-Box-antenna	

State of development work unknown.

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Annex 8 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk Koe nick

Type: FBR 1

Work name: -

Range of use: The devices are used as navigation and meteorological radar.

Technical Data

Transmitter	Frequency:	9,375 Mc
	Pulse performance:	40 kW
	PRF:	400 Kc
	Pulse duration:	2 μsec
	Magnetron:	2J55
Indication	Measuring ranges:	20-60-120 naut. mi.
	target screen:	9x12 cm
Antenna	Number of revolutions:	15 r.p.m.
	Beaming:	4.5°
	Shape:	Rotation of the 5 -cm-parabolic reflector in the aircraft nose. Angle of detection: $\pm$ 90°
	Poharization:	The device can be adjusted to avoid indication of rain.

Development: 1957: first plans

1959: start of development work and construction of a laboratory model

May 1961: development works were discontinued.

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Annex 9 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk Koepenick

Type: DMA - 1

Range of use: Doppler navigator

Technical Data

Transmitter	Frequency:	9,375 Mc
	PRF:	20/50 Kc
	Pulse duration:	3 μsec
Indication	Measuring ranges:	
	Maximum range:	
	Smallest measurable range:	
	Discriminination: distance;	
	Discrimination: angle:	
Antenna	Number of revolutions:	
	Beaming, hor.: , vert.:	
	Shape:	

Development: Development of this project, which was suggested by the USSR, began in 1959.

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Annex 10 [redacted] 50X1-HUM

Radar Devices Manufactured by VEB Funkwerk Koepenick

Type: W R - 1

Work name:

Range of use: Meteorological radar

Technical Data

Transmitter	Frequency:	9,375 Mc
	Pulse performance:	40 kW
	PRF:	400 Kc
	Pulse duration:	2 μsec
Indication	Measuring ranges:	
	Maximum range: approx. 300 km	
Antenna	Number of revolutions:	
	Beaming, hor.: 0.8°, vert.: 2°	
	Shape:	
	Adjustable polarization	
	The antenna can swing 30° in a vertical position.	

Development works are still in the initial stage.

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Annex 11

Radar Devices Manufactured by VEB Funkwerk Koepenick

Type: PEM - 4

Work name: -

Range of use: Precision distance measuring equipment for land survey. The accuracy of measurement is reported to be ± 1 m at a distance of 30 km.

Technical Data

Transmitter Klystron 723 A/B
(Type 723 A/B, manufactured in East Germany, operates in the range between 8,702 and 9,548 Mc with a performance of 10 mW).

	Modulation	Master Station	Called Station
For	Zero error elimination	A + [illegible]	10.001 Mc
	for measurement	A 10.000	9.999 Mc
		B 9.990	9.989 Mc
		C 9.900	9.899 Mc
		D 9.000	8.999 Mc

Indication
Master Station: 1 screen for phase indication
Called Station: 1 screen for indication of the 1 Ke needle impulse.
Range: 30 km

Antenna
Shape: parabolic reflector of 50 cm ∅
Beaming: 5°
Polarization: one plane each for transmitting and receiving, placed at right angle to each other.

Power supply
Consumption: 60 W
Battery: 12 V/ 120 Ah

Development: A model device was constructed in 1961.
Development works were stepped up in 1962

Production:

Customers: Ministry of the Interior for surveying purposes
Estimated want: 60 installations p.a.
(one installation comprises 2 devices)

The development was inspired by an American tellurometer of which wiring schemes were procured during a visit to the US.

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